

hurricane squalls, with wind blowing constantly from the northwest. On these two days gales of force 10 to 12 covered the area between 150° and 170° E., 30° and 50° N.

On the succeeding days of the month storm to hurricane winds were reported as follows: On the 24th, by the American S. S. *West Niger*, NW. 11, lowest pressure 29.35 inches, in 36° 41' N., 152° 33' E.; on the 25th, by the Japanese S. S. *Manila Maru*, NE. 11, lowest pressure 29.39, in 44° 19' N., 159° 34' E.; on the 27th, by the American S. S. *West Chopaka*, NW. 11, lowest pressure 29.35, in 37° 19' N., 148° 04' E.; on the 31st, by the American S. S. *Dilworth*, SE. to WSW. 11, lowest pressure 28.88, in 34° 58' N., 156° 16' E.

From the two foregoing paragraphs, it will be seen by how narrow a margin of escape from preceding and subsequent rough weather did the *President Jefferson*, previously mentioned, day by day make her remarkable, storm-free voyage.

Attention must be directed to the area lying along the canal route between the 85th and the 100th meridians. Unusual storm conditions prevailed from the 5th to the 9th throughout this region, the winds becoming especially violent on the 6th and 7th over the Gulf of Tehuantepec. The American S. S. *Steel Scientist*, southward bound, commented as follows:

January 5. Encountered a wind from NNE. in latitude 14° 56' N., longitude 96° 32' W., barometer 29.91. Constant blow from NNE., reaching up to force 11, lowest barometer 29.81 on the 6th, in 14° 44' N., 96° 06' W. Ended Jan. 7 in latitude 13° 06' N., 93° 53' W., barometer 29.97. On the 7th encountered a wind from the E., barometer 29.80, in latitude 10° 01' N., longitude 88° 23' W.

The American S. S. *D. G. Schofield*, southward bound, experienced a hurricane from the northeast at 1 p. m. of the 6th, lowest pressure 29.96, in 15° 09' N., 94° 27' W. The gale continued to be experienced by the vessel until well into the 7th when, at 6 a. m., the wind was north-northwest 9, pressure 29.98, in 13° 27' N., 93° 58' W. On the 8th and 9th other gales were encountered, the highest force being 9 from the northeast, on the 9th, lowest pressure 29.85, in 10° 06' N., 87° 31' W. Several other vessels noted gales of force 8 to 10 at this time.

On the 20th to 23d high winds, though not exceeding 10 in force, occurred in the same region. The American S. S. *W. S. Rheem* early on the 21st was in a northwesterly gale, force 10, pressure 29.82, in 15° 52' N., 93° 54' W., and the American S. S. *Hampton Roads* on the 23d experienced a northeasterly gale, force 8, in 9° 42' N., 86° 11' W.

During the prevalence of these storms a strong norther occurred over the Gulf of Mexico.

Fog occurred more frequently in January than during the preceding month. On the China coast the phenomenon was noted on the 13th to 16th. Along northern and middle latitudes in west longitudes fog occurred on several days. None was reported from east longitudes, except as noted. Fog showed a considerable increase along the American coast, and was frequently observed outside the harbors of Seattle, San Francisco, and San Diego. One record comes from 10° 43' N., 90° 19' W., where it was observed on January 12 over a cool current of water.

DETAILS OF THE WEATHER IN THE UNITED STATES.

551.506 (73)

GENERAL CONDITIONS.

ALFRED J. HENRY.

The month was cold and generally dry, the drought being most pronounced on the Pacific coast and thence eastward to the Rocky Mountains; precipitation was in excess of the normal over a narrow strip extending from the East Gulf States northeastward to New England (see inset chart of Chart IV).

The defect in temperature was due to the passage of four vigorous anticyclones across the country. The usual details follow.

CYCLONES AND ANTICYCLONES.

By W. P. DAY.

The month of January showed an increase in activity over the preceding month, particularly in the number and strength of the high-pressure areas. Twelve of the latter made their appearance in the Canadian Northwest and half of these followed a well-defined path southeastward down the Missouri Valley and thence eastward or east-northeastward to the Atlantic coast. During the evening of the 4th and the morning of the 5th there were two separate high-pressure areas with barometer reading over 31 inches, one nearly stationary over the northern Plateau and Rocky Mountain region and the other moving southeast over the middle and lower Missouri Valley.

The Alberta type was the most frequent low charted; but the more important storms of the month developed over southwestern districts.

FREE-AIR SUMMARY.

By L. T. SAMUELS, Meteorologist.

The outstanding feature of Table 1 is the subnormal monthly mean temperature at all stations and practically all levels. The most severe cold wave of the month occurred on the 4th and 5th. During this period minimum temperatures exceeded all previous January records at most of the aerological stations. At Ellendale the lowest temperature for the month, -39° C. (-38° F.), occurred at 3,500 m. and at Drexel, -26° C. (-15° F.), at 2,500 m. on the 4th; at Broken Arrow, -22° C. (-8° F.), at 650 m.; at Groesbeck, -10° C. (14° F.), at 1,050 m., and at Royal Center, -33° C. (-27° F.), at 900 m. on the 5th.

It is of interest to note some of the changes in the free air over Ellendale as shown by the kite records of these two dates (4th-5th). These are shown in the following table:

Free-air conditions above Ellendale, N. Dak., on January 4-5, 1924.

[Altitude (meters) above sea level.]

	Date.	Surface 444.	1,000	1,500	2,000	2,500	3,000	3,500
Temperature (°C.)	4	-31.0	-33.9	-33.5	-33.7	-34.6	-36.7	-38.9
	5	-31.8	-18.4	-15.7	-14.9	-13.6	-12.3	-11.6
Relative humidity (per cent.)	4	81	89	88	86	84	84	84
	5	83	48	29	17	21	25	29
Vapor pressure (mb.)	4	0.26	0.22	0.23	0.22	0.20	0.16	0.13
	5	0.27	0.59	0.46	0.29	0.40	0.53	0.66
Wind direction and velocity (m. p. s.)	4	NW.	N.	N.	N.	N.	N.	N.
	5	7.6	16.5	16.6	17.4	18.6	19.1	19.6
		SSW.	W.	WNW.	NW.	NNW.	NNW.	N.
		5.8	8.4	8.5	9.6	14.2	18.7	22.5

It will be observed that a pronounced rise in temperature, resulting in a strongly marked inversion on the 5th, occurred in the upper levels while the wind is shown to have changed to southerly at the surface but continued from a northerly point above. In spite of the small variation in the observed wind direction in the upper levels, however, there occurred a decided rise in temperature. It is also shown that this air on the 5th contained a much lower relative humidity while the absolute moisture content was greater than on the 4th. The weather map of the 4th shows Ellendale to have been in the eastern quadrant of a strong high pressure area; by the 5th this HIGH had moved southeastward so that Ellendale was slightly west of its northern border, a Low was approaching from the northwest and another large HIGH was centered over the northern Plateau region. It is evident from an inspection of the weather maps that the "polar" air of which the first HIGH was composed had ceased influencing free-air conditions at Ellendale by the 5th and that on that date the upper NNW. winds were bringing in air which had followed a curved path round the northern border of the Plateau HIGH.

By the 6th the first HIGH had become centered over the lower Mississippi Valley bringing extremely low temperatures eastward to the coast. West of its center the winds being southerly caused the temperatures to be considerably higher than over the East Gulf and South Atlantic States. Therefore, owing to the appreciable difference in the air densities over these adjacent regions, a general west-to-east pressure gradient was set up. The upper winds on this date over Groesbeck and Broken Arrow revealed such a gradient. At these stations southerly winds in the lower levels veered to N. and NE. above 4 km. and remained so up to 9 and 10 km. These winds were of moderate velocity but above 10 km. the direction changed to WNW. and the velocity increased rapidly to 35 m. p. s. (78 m. p. h.) at which time the balloons were lost.

The northern quadrant of this HIGH controlled weather conditions over Royal Center on this date (6th) and in several respects these were of more than ordinary interest. The surface wind shifted from W. to a southerly quarter shortly after midnight and a pilot balloon released at 7:25 a. m. entered St Cu clouds 7 minutes later at 1,350 m. above ground. These clouds were moving from the WNW., while the surface-wind direction was SSW., the south component extending up to 1,000 m. above the surface. A kite flight started at 8:25 a. m., one hour later, showed a south component in the wind extending from the ground to more than 2,000 m. above, which fact is of special interest in that it is evident that the southerly wind appeared first in the lower levels. The striking effect of this southerly wind upon the free-air temperatures which prevailed the day before may be seen from the following table.

Free-air conditions above Royal Center, Ind., on January 5-6, 1924.

[Altitude (meters) above sea level.]

	Date.	Surface 225	500	1,000	1,250	1,500	2,000
Temperature (°C.).....	5	-25.7	-28.6	-26.2	-28.2	-30.2	-29.5
	6	-20.6	-22.9	-18.3	-11.4	-7.2	-2.9
Relative humidity (per cent).....	5	88	91	98	98	99	99
	6	85	80	87	43	46	91
Vapor pressure (mb.)....	5	0.53	0.40	0.56	0.45	0.38	0.40
	6	0.84	0.63	0.84	0.99	1.54	4.38
Wind direction and velo- city (m. p. s.).....	5	W. 10.7	W. (*)	WNW. (*)	WNW. (*)	NW. (*)	NW. (*)
	6	SSW. 8.0	SSW. 16.0	SSW. 18.5	SW. 18.0	SW. 17.4	SW. 16.4

* Velocities missing.

Another interesting fact shown by the kite record of the 6th but not brought out in the above table was an increase in relative humidity from 35 to 93 per cent which occurred in the free air simultaneously with an increase in temperature from -8.4° to -2.5° . Such an occurrence is not frequently found, but instead, sharp changes in temperature are usually accompanied by opposite changes in relative humidity. However, in this instance, it was found that the St Cu clouds (8/10 in amount) observed at an altitude of 1,350 m. in the early morning dissipated rapidly a short time thereafter and by the time the head kite reached the height at which the clouds had previously obtained the relative humidity was still high (93 per cent) although the clouds themselves were not visible. It is conceivable that the south wind as it has been shown to have extended progressively upward dissipated the clouds and very likely a kite flight made a little later would have revealed a much lower relative humidity at this level.

On the afternoon of the 23d pilot-balloon observations made at Washington and Bolling Field, D. C., were strikingly similar, although showing extremely unusual wind velocities in the free air, the direction veered gradually from SW. at the surface to NW. at 2,500 m., but directly above this it backed again to W. A steady increase in velocity was found from 7 m. p. s. (16 m. p. h.) at the surface to 41 m. p. s. (92 m. p. h.) at 2,000 m., then a rapid fall to 9 m. p. s. (20 m. p. h.) at 3,000 m., increasing again to 44 m. p. s. (98 m. p. h.) at 4,000 m., followed by another drop to 15 m. p. s. (33 m. p. h.) at 5,000 m., at which elevation the balloon was lost. There have on several occasions in the past been observed rather similar conditions but none of such great magnitude. Some of these were cited in the "Free-air summaries" of October and November, 1922. The exact causes producing this phenomenon are not known, but it is obviously characteristic of the region undergoing change from the influences of a Low to those of a HIGH and followed by a rapid movement of the barometric areas. This apparent stratification in the upper levels has been observed most frequently at the eastern stations and it seems rather certain that its most pronounced stage continues only for a brief period of time, although there has appeared some evidence of it even after 12 hours. It seems likely that large horizontal differences in temperature of rather local character at various levels are responsible for these abnormal winds but to determine this with certainty it will be necessary to have a much closer network of stations.

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during January, 1924.

TEMPERATURE (°C.).

Altitude. m. s. l. (m.)	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (226 m.)	
	Mean.	De- par- ture from 6-yr. mean.	Mean.	De- par- ture from 9-yr. mean.	Mean.	De- par- ture from 3-yr. mean.	Mean.	De- par- ture from 7-yr. mean.	Mean.	De- par- ture from 6-yr. mean.	Mean.	De- par- ture from 6-yr. mean.
Surface..	0.2	-4.0	-9.6	-3.5	4.3	-2.3	-15.6	-4.5	3.9	-4.4	-6.9	-3.1
250.....	0.2	-4.0	.....	.....	4.3	-2.2	.....	.....	3.9	-4.1	-7.0	-3.0
500.....	-0.4	-4.0	-9.5	-3.3	4.0	-1.8	-15.5	-4.5	3.9	-3.6	-8.1	-3.0
750.....	-0.9	-4.1	-8.8	-3.0	4.0	-1.4	-15.4	-4.9	3.7	-3.6	-8.5	-3.0
1,000.....	-0.9	-4.0	-7.7	-2.8	3.9	-0.9	-14.1	-5.0	3.6	-3.8	-8.5	-3.0
1,250.....	-0.7	-3.7	-6.9	-2.6	3.8	-0.3	-12.9	-4.7	3.5	-3.7	-8.6	-3.0
1,500.....	-0.7	-3.4	-6.5	-2.1	3.3	0.0	-12.7	-4.5	3.0	-3.7	-9.0	-3.1
2,000.....	-2.2	-3.5	-7.5	-1.8	2.0	+0.5	-13.5	-3.9	1.6	-3.5	-9.7	-3.0
2,500.....	-4.6	-3.6	-9.4	-1.5	0.6	+0.5	-15.3	-3.6	-0.4	-3.1	-12.1	-3.7
3,000.....	-6.9	-3.5	-12.4	-2.0	-1.4	+1.0	-17.2	-2.9	-2.5	-3.1	-14.1	-3.5
3,500.....	-9.3	-3.4	-15.4	-2.5	-4.8	+0.1	-19.9	-2.8	-5.4	-3.3	-17.0	-3.9
4,000.....	-11.7	-3.1	-18.5	-2.8	.....	0.0	-22.9	-3.2	-8.4	-3.5	.....	.....
4,500.....	-14.4	-2.8	-22.1	-3.3	.....	.....	-26.1	-3.8	-12.3	-4.2	.....	.....
5,000.....	-17.1	-2.7	-25.7	-3.6	.....	.....	-29.5	-4.4	-15.9	-4.3	.....	.....

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during January, 1924—Continued.

RELATIVE HUMIDITY (%).													
Altitude. m. s. l. (m.)	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (225 m.)		
	Mean.	De- parture from 6-yr. mean.	Mean.	De- parture from 9-yr. mean.	Mean.	De- parture from 3-yr. mean.	Mean.	De- parture from 7-yr. mean.	Mean.	De- parture from 6-yr. mean.	Mean.	De- parture from 6-yr. mean.	
Surface...	69	-1	88	+6	68	+1	80	-2	77	0	81	+2	
250.....	69	-1	88	+6	67	0	80	-1	74	-1	80	+1	
500.....	64	0	85	+6	63	0	79	-2	67	-5	73	-1	
750.....	62	+2	78	+5	60	0	75	+1	63	-5	68	-1	
1,000.....	59	+3	73	+6	58	0	72	+5	59	-3	63	-1	
1,250.....	55	+3	68	+5	55	-2	68	+7	53	-4	58	-1	
1,500.....	51	+3	65	+5	53	-3	66	+7	50	-4	57	+1	
2,000.....	45	+2	64	+6	48	-3	66	+8	45	-4	59	+8	
2,500.....	44	+3	60	+3	42	-6	68	+10	39	-7	57	+6	
3,000.....	46	+6	62	+5	39	-7	68	+10	35	-8	58	+6	
3,500.....	44	+5	61	+6	37	-9	64	+9	33	-8	62	+5	
4,000.....	42	+6	59	+5	36	-10	65	+12	34	-4	.....	.....
4,500.....	41	+5	59	+5	.....	.....	69	+10	34	-3	.....	.....
5,000.....	43	+6	60	+6	.....	.....	69	+10	33	-3	.....	.....

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during January, 1924—Continued.

VAPOR PRESSURE (mb.).												
Altitude. m. s. l. (m.)	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (225 m.)	
	Mean.	De- parture from 6-yr. mean.	Mean.	De- parture from 9-yr. mean.	Mean.	De- parture from 3-yr. mean.	Mean.	De- parture from 7-yr. mean.	Mean.	De- parture from 6-yr. mean.	Mean.	De- parture from 6-yr. mean.
Surface..	4.50	-1.62	2.88	-0.50	5.95	-0.96	1.83	-0.57	6.81	-2.22	3.41	-0.56
250.....	4.47	-1.60	.....	.....	5.91	-0.91	.....	.....	6.60	-2.09	3.35	-0.52
500.....	4.08	-1.31	2.84	-0.40	5.62	-0.56	1.81	-0.56	6.06	-2.00	2.82	-0.55
750.....	3.78	-1.09	2.74	-0.22	5.39	-0.38	1.71	-0.47	5.54	-1.88	2.56	-0.49
1,000.....	3.51	-0.88	2.63	-0.17	5.24	-0.20	1.79	-0.33	5.13	-1.57	2.34	-0.43
1,250.....	3.28	-0.70	2.49	-0.16	4.93	-0.07	1.82	-0.23	4.54	-1.53	2.07	-0.43
1,500.....	3.06	-0.49	2.37	-0.12	4.54	-0.02	1.76	-0.17	4.02	-1.49	1.95	-0.33
2,000.....	2.49	-0.40	2.09	-0.08	3.45	-0.17	1.58	-0.12	3.08	-1.37	1.95	+0.06
2,500.....	2.15	-0.26	1.69	-0.13	2.63	-0.31	1.34	-0.06	2.26	-1.39	1.46	-0.18
3,000.....	1.84	-0.19	1.35	-0.18	2.06	-0.27	1.08	-0.02	1.77	-1.20	1.24	-0.19
3,500.....	1.48	-0.25	0.93	-0.30	1.52	-0.43	0.68	-0.09	1.31	-1.13	1.13	-0.14
4,000.....	1.22	-0.18	0.62	-0.35	1.23	-0.42	0.46	-0.07	0.99	-0.98	.....	.....
4,500.....	1.00	-0.20	0.39	-0.37	.....	.....	0.32	-0.31	0.69	-0.97	.....	.....
5,000.....	0.91	-0.20	0.28	-0.26	.....	.....	0.17	-0.38	0.49	-0.91	.....	.....

TABLE 2.—Free-air resultant winds (m. p. s.) during January, 1924.

Altitude, m. s. l. (meters).	Broken Arrow, Okla. (233 meters).				Drexel, Nebr. (396 meters).				Due West, S. C. (217 meters).				Ellendale, N. Dak. (444 meters).				Groesbeck, Tex. (141 meters).				Royal Center, Ind. (225 meters).			
	Mean.		6-year mean.		Mean.		9-year mean.		Mean.		3-year mean.		Mean.		7-year mean.		Mean.		6-year mean.		Mean.		6-year mean.	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface.....	S. 12° W.	0.7	S. 32° W.	1.1	S. 66° W.	1.8	N. 89° W.	1.6	N. 50° W.	1.0	N. 76° W.	1.2	N. 66° W.	4.0	N. 58° W.	3.1	N. 10° W.	0.5	N. 34° W.	0.5	S. 57° W.	2.6	S. 52° W.	2.2
250.....	S. 12° W.	0.8	S. 29° W.	1.3	S. 8° W.	1.3	N. 51° W.	1.0	N. 79° W.	1.4	N. 64° W.	1.4	N. 64° W.	8.2	N. 64° W.	5.4	S. 51° W.	3.1	S. 60° W.	2.5	S. 60° W.	7.5	S. 66° W.	6.7
500.....	S. 24° W.	2.3	S. 26° W.	2.3	S. 84° W.	2.8	N. 83° W.	2.4	S. 64° W.	1.1	S. 86° W.	2.6	N. 71° W.	4.9	N. 61° W.	3.4	S. 38° W.	2.8	S. 52° W.	1.5	S. 54° W.	6.1	S. 59° W.	4.7
750.....	S. 44° W.	3.2	S. 34° W.	3.3	N. 86° W.	4.9	N. 77° W.	4.3	S. 88° W.	2.6	S. 83° W.	4.2	N. 64° W.	8.2	N. 64° W.	5.4	S. 51° W.	3.1	S. 60° W.	2.5	S. 60° W.	7.5	S. 66° W.	6.7
1,000.....	S. 55° W.	4.2	S. 48° W.	3.8	N. 82° W.	6.3	N. 76° W.	5.6	S. 65° W.	4.3	S. 82° W.	5.6	N. 56° W.	9.5	N. 62° W.	6.6	S. 63° W.	3.7	S. 62° W.	3.5	S. 65° W.	9.0	S. 75° W.	7.7
1,250.....	S. 82° W.	4.2	S. 66° W.	3.9	N. 79° W.	8.3	N. 75° W.	6.9	S. 71° W.	6.5	.....	7.5	N. 51° W.	10.5	N. 63° W.	7.6	S. 68° W.	5.1	S. 71° W.	4.7	S. 69° W.	12.2	S. 79° W.	9.3
1,500.....	W.	6.1	S. 66° W.	5.0	N. 79° W.	9.2	N. 74° W.	8.2	S. 70° W.	8.9	S. 85° W.	9.3	N. 55° W.	10.1	N. 64° W.	8.0	S. 82° W.	5.6	S. 76° W.	5.8	S. 70° W.	13.0	S. 82° W.	10.4
2,000.....	N. 86° W.	7.8	S. 78° W.	7.1	N. 76° W.	11.6	N. 73° W.	10.6	S. 73° W.	13.2	S. 89° W.	12.1	N. 56° W.	12.7	N. 64° W.	10.6	S. 85° W.	7.5	S. 79° W.	7.3	S. 69° W.	14.6	S. 82° W.	12.2
2,500.....	W.	8.3	S. 84° W.	8.4	N. 78° W.	13.3	N. 79° W.	12.8	S. 80° W.	16.4	N. 88° W.	15.2	N. 56° W.	14.4	N. 64° W.	12.7	S. 78° W.	9.8	S. 80° W.	8.6	S. 79° W.	14.8	S. 88° W.	14.3
3,000.....	N. 88° W.	8.5	N. 86° W.	9.7	N. 83° W.	13.4	N. 80° W.	14.2	S. 84° W.	16.8	S. 89° W.	16.6	N. 59° W.	15.8	N. 68° W.	14.2	S. 71° W.	11.4	S. 79° W.	10.1	S. 78° W.	14.4	S. 87° W.	14.2
3,500.....	N. 75° W.	10.2	N. 82° W.	10.4	N. 83° W.	16.3	N. 80° W.	15.4	S. 87° W.	14.2	S. 87° W.	15.7	N. 62° W.	14.6	N. 67° W.	15.1	S. 69° W.	14.2	S. 82° W.	11.2	S. 45° W.	15.3	S. 76° W.	13.2
4,000.....	N. 73° W.	12.0	N. 84° W.	13.4	N. 79° W.	18.5	N. 87° W.	17.0	S. 45° W.	15.6	N. 89° W.	15.0	N. 61° W.	15.7	N. 60° W.	16.6	S. 65° W.	14.0	S. 74° W.	12.4	S. 45° W.	18.1	S. 66° W.	17.3
4,500.....	S. 87° W.	8.7	S. 82° W.	10.5	N. 81° W.	17.1	N. 81° W.	17.3	.....	.....	.....	.....	N. 46° W.	20.6	N. 50° W.	19.4	S. 67° W.	17.3	S. 73° W.	14.3	.....	.....	.....	.....
5,000.....	N. 86° W.	9.0	N. 88° W.	11.9	N. 68° W.	16.6	N. 83° W.	16.6	.....	.....	.....	.....	.....	.....	.....	.....	S. 82° W.	16.5	S. 88° W.	15.2	.....	.....	.....	.....

THE WEATHER ELEMENTS.

By P. C. DAY, Meteorologist in Charge of Division.

PRESSURE AND WINDS.

January, 1924, will be remembered throughout much of the country as a month of rapid and well-marked variations in weather conditions. This was particularly noticeable in the great central valleys, where temperature changes especially were frequent and large, in fact at a number of points the average temperature variability was the greatest of record.

Anticyclones of a pronounced winter type moved from Canada into the United States at frequent intervals, pursued courses well to the southward, and brought severe cold to the Gulf and South Atlantic Coast States. The most important of these entered the far Northwest on the 4th with pressure readings, reduced to sea level, above 31 inches, and advanced into the central valleys by the morning of the 5th, and to the Gulf States during the following 24 hours. This high pressure area maintained its initial strength as it moved eastward and southward to a remarkable degree and gave the highest pressure readings ever recorded at numerous points in the southern Plains and Gulf States.

This anticyclone was attended by unusual cold over the Southern States from Texas eastward, approaching closely the temperatures experienced during the record-breaking cold wave of February, 1899, and caused immense damage in the fruit and vegetable growing regions along the Gulf and South Atlantic coasts, although the severe cold did not reach the important citrus and early vegetable districts of central and southern Florida, nor those of the lower Rio Grande Valley of Texas.

Other important anticyclones, attended by severe cold, moved southward and eastward from the Canadian Northwest about the end of the first decade, near the middle of the second decade, on the 20th to 21st, and again on the 25th and 26th.

At the beginning of the month an important cyclone, though attended mainly by only light rain or snow, was moving down the St. Lawrence Valley, and another was developing over the far Southwest. The latter moved eastward and, with another that appeared to have developed over the Great Lakes, gave extensive precipitation from the Mississippi Valley eastward, with heavy falls over the Ohio Valley and portions of the Gulf and Atlantic Coast States.

By the end of the first decade a cyclone of considerable proportions had developed over the middle Mississippi